

**APPARATUS AND METHOD FOR SYNCHRONIZATION IN A
MULTIPLE-CARRIER COMMUNICATION SYSTEM BY OBSERVING A
PHASE-FREQUENCY RELATIONSHIP OF A PLURALITY OF PILOT
SIGNALS**

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ABSTRACT OF THE INVENTION

A method, apparatus and system detects a loss of synchronization between a transmitter and a receiver in a multiple-carrier communication system such as an OFDM system. A phase-frequency synchronization detector determines when the receiver has lost synchronization with the transmitter based on a phase-frequency relationship of plurality of pilot signals transmitted at different frequencies from the transmitter and received at the receiver. A loss of synchronization is detected when a slope of a line defined by the phase-frequency relationship exceeds a timing threshold more at a rate in excess of an occurrence threshold within a time period.

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